

### REMARKS

Claims 1-20 and 24 are pending in the subject application, of which claim 1 is independent. Claims 21-23 and 25 are withdrawn. Favorable reconsideration and further examination are respectfully requested.

#### Allowed claims

We note that while the Office Action rejects claims 1, 2, 8, 10, and 18-20 under U.S.C. §§ 102 and 103, the Office Action also states that claims 1, 2, 4, 5, 7, 8, 10-17, and 24 are allowed. For example, the Office Action states the following:

#### **Disposition of Claims**

- 4) ☒ Claim(s) 1, 2, 4-20 and 24 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☒ Claim(s) 1, 2, 4, 5, 7, 8, 10-17 and 24 is/are allowed.  
6) ☒ Claim(s) 6, 9, and 18-20 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Clarification is respectfully requested.

#### Claim rejections under 35 U.S.C. § 112, fourth paragraph

Claims 6 and 9 were rejected for allegedly failing to specify a further limitation of the subject matter claimed of a claim previously set forth. In this regard, the Office Action states:

Claim(s) 6 and 9 is/are rejected under 35 U.S.C. 112, fourth paragraph, as being indefinite for failing to specify a further limitation of the subject matter claimed of a claim previously set forth. Specifically, these compositions include Mg as a B atom, a possibility that is prohibited by the current amendment.

1

Without conceding the appropriateness of the rejections, we have amended claim 1 (from which claims 6 and 9 depend) to provide that B comprises strontium, magnesium, or calcium. As a result, we respectfully request that the rejections be withdrawn.

#### Rejections under 35 U.S.C. §§ 102, 103

Claims 1, 2, 8, 10, and 18-20 were rejected over Yokosuka. Claims 18-20 were rejected over Yokosuka in view of U.S. Patent No. 5,527,481 (Otsu). Claims 11-17 were rejected over Yokosuka in view of U.S. Patent Publication No. 2003/0174553 (Salto). Claim 5 was rejected over Yokosuka in view of "Effects of strontium substitution in NB-doped PZT ceramics" (Zheng).

Independent claim 1 is shown below.

1. A ceramic material comprising:  
a solid solution comprising:  
a first ceramic material having a perovskite structure and defining a host lattice,  
the first ceramic material comprising lead, zirconium and titanium; and  
a second ceramic material having a cryolite structure and comprising  $A_4(B_{2-2x/3}Nb_{2+2x/3})O_{11+x}V_{1-x}$ , where A comprises barium or strontium, where B comprises strontium, magnesium, or calcium, where V comprises an oxygen vacancy, and where  $0 \leq x < 1$ .

The applied art is not understood to describe or suggest at least the underlined features of claim 1 above.

More specifically, Yokosuka is understood to disclose dielectric, piezoelectric, and optical characteristics of  $Ba(Ca_{1/3}Nb_{2/3})O_3$ - $PbZrO_3$ - $PbTiO_3$ .<sup>2</sup> In section 2 of Yokosuka, the

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<sup>1</sup> Office Action, page 2/

structure  $\text{Ba}(\text{Ca}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-PbZrO}_3\text{-PbTiO}_3$  is depicted as  $x\text{Ba}(\text{Ca}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-(1-x)[Pb(Zr}_Y\text{Ti}_{1-Y})\text{O}_3]$ . This system is referred to as a “solid solution.”<sup>3</sup>

Otsu appears to disclose a ceramic composition represented by the formula  $(\text{Pb}_{1-x}\text{-Me}_x)(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{a}^+(\text{Ti}_c\text{Zr}_d\text{O}_3)$ , wherein x is between 0 and 0.12, a is 0.01 to 0.1, c is 0.3 to 0.6, d is 0.25 to 0.55, and Me is selected from Sr, Ba, and Ca.<sup>4</sup>

Zheng appears to disclose substituting Sr for Pb in Nb-doped PZT-perovskites, thereby improving the material properties.<sup>5</sup>

None of the references mentioned above appear to describe or suggest a ceramic material that includes a solid solution of two ceramic materials, wherein the second ceramic material includes an oxygen vacancy (e.g., represented by the formula  $\text{A}_4(\text{B}_{2-2x/3}\text{Nb}_{2+2x/3})\text{O}_{11+x}\text{V}_{1-x}$ , wherein A comprises barium or strontium, B comprises strontium, magnesium, or calcium, V comprises an oxygen vacancy, and where  $0 \leq x < 1$ ). According to German counsel, such a second ceramic material can be used to produce an advantageous material for piezoceramic applications.<sup>6</sup>

Salto, cited for allegedly teaching the adding perovskites is conventional in the art of creating a ferroelectric material (especially tailored to be incorporated into a semiconductor memory device), is not understood to remedy the foregoing deficiencies of Yokosuka, Otsu, and Zheng.

For at least the foregoing reasons, claim 1 is believed to be patentable over the applied art.

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<sup>2</sup> Yokosuka, Abstract.

<sup>3</sup> *Id.*, section 1, third paragraph.

<sup>4</sup> Otsu, Abstract.

<sup>5</sup> Zheng, Abstract. *See also id.*, FIG. 8.

<sup>6</sup> *See, e.g.*, the subject specification at page 7, first paragraph. *See also id.*, pages 8-9.

Dependent claims are believed to define patentable features. Each dependent claim partakes in the novelty of its corresponding independent claim and, as such, the dependent claims have not been discussed specifically herein.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

We believe the application is in condition for allowance, which action is respectfully requested.

The fee for a two-month extension of time is being paid concurrently herewith by way of Deposit Account Authorization. Please apply any charges or credits to deposit account 06-1050, referencing the above attorney docket no.

Respectfully submitted,

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